

ART 34 AMDT

New Patent Claims:

1. Method for qualification of telephone lines (10) with two metal wires (13, 14) as signal conductors for suitability for data transmissions at frequencies above the speech band, having the following method steps:
- (a) a test signal in the form of an AC voltage is fed into the telephone line (10),
- (b) a reflection signal of the test signal is measured, which can be tapped off as the component, reflected on the input impedance of the entire line (10), of the test signal fed in at the start of the telephone line,
- (c) the first two method steps (a) and (b) are carried out at a number of different frequencies within a preselected frequency range of the AC voltage of the test signal in order to measure any phase shift in the reflection signal with respect to the test signal at the respective frequency,
- (d) the phase shift is analyzed as a function of the frequency in order to assess the telephone line,
- characterized in that the analysis comprises the following method steps:
- (d1) the first derivative (91) of the phase shift is formed on the basis of the frequency,
- (d2) the second derivative (94) of the phase shift is formed based on the frequency,
- (d3) the second derivative of the phase shift is investigated for one or more mathematical sign changes (95), in which case

ART 34 AMDT

- 5 (d4) when a mathematical sign change occurs in
the second derivative of the phase shift,
the telephone line is assessed as not
being suitable for use for data
transmission at frequencies above the
speech band, without further technical
actions.
- 10 2. Method for qualification of telephone lines
according to Claim 1,
characterized
in that the AC voltage is a sinusoidal AC voltage.
- 15 3. Method for qualification of telephone lines
according to Claim 1 or 2,
characterized
in that the phase shift is determined by means of
a phase discriminator (143).
- 20 4. Method for qualification of telephone lines
according to Claim 1 or 2,
characterized
in that the phase shift is determined by means of
a quadrature demodulator (150).
- 25 5. Method for qualification of telephone lines
according to one of Claims 1-4,
characterized
in that the frequency range is chosen to be from
30 1.0 to 5.0 kHz.
- 35 6. Method for qualification of telephone lines,
characterized
in that the frequencies are chosen with regular or
logarithmic intervals between the individual
frequencies.

7. Method for qualification of telephone lines according to one of Claims 1 to 6, characterized in that, before the second derivative (94) of the phase shift is formed, the individual phase shifts are averaged (92) in order to smooth them in the profile.
8. Method for qualification of telephone lines according to Claim 7, characterized in that median formation is carried out as smoothing.
9. Method for qualification of telephone lines according to one of Claims 7 or 8, characterized in that, in a step which follows the median formation, individual smoothed phase shifts, which are at a regular interval from one another, are supplied for further evaluation.
10. Method for qualification of telephone lines according to one of Claims 1 to 9, characterized in that, in step (d4), load coils (15, 16) are detected in the telephone line if there is a mathematical sign change in the second derivative.
11. Use of a DSL modem (100) for carrying out the method according to one of Claims 1 to 10, characterized in that the data driver and receiving module (103, 104) which is provided in the DSL modem (100) that is used is used.

12. Use of a DSL modem (100) for carrying out the method according to one of Claims 1 to 10, characterized in that an existing test module (102) is used, in order to make it possible to pass analog currents and/or voltages of different types to the line (10) and to measure them, in order in this way to make it possible to carry out an electrical test of the input impedance of the line (10).
13. Use of a DSL modem (100) according to one of Claims 11 or 12, characterized in that the DSL modem (100) is an ISDN, VDSL, ADSL, SHDSL or SDSL modem.